REMARKS

Upon entry of the present amendment, claims 1-26 will be pending in the application. Claim 1 has been amended, claims 25 and 26 have been added, and no claims have been canceled, leaving claims 1-26 for consideration upon entry of the present amendment

Reconsideration and allowance of the claims are respectfully requested in view of the above amendments and following remarks.

1. Claim Amendment and New Claims

A grammatical correction has been made to claim 1.

New claims 25 and 26 have been drafted to more specifically claim the invention.

Claim 25 has been drafted to recite that basecoat films 1a and 2a are flashed off for 1 to 6 minutes at a temperature, humidity, and airspeed prevailing during application of the pigmented basecoat materials, and clearcoat film 3a is flashed off for 2 to 8 minutes at a temperature, humidity, and airspeed prevailing during application of the clearcoat material. Support for this claim can be found at least on p. 24, ll. 17-22, p. 26, ll. 21-26, and p. 29, ll. 1-6 of the present application.

Claim 26 has been drafted to recite that the residual volatiles contents of basecoat films 1a and 2a is adjusted at a temperature of 30 to 100°C, a humidity of 3 to 15 g/kg, and an airspeed of 0.2 to 15 m/s for 1 to 10 minutes; and that the residual volatiles content of clearcoat film 3a is adjusted at a temperature of 80 to 140°C. Support for this claim can be found at least on p. 25, ll. 15-20, p. 27, ll. 19-24, and p. 29, l. 27-28 of the present application.

2. Rejection of claims 1-8, and 10-24 under 35 U.S.C. §103(a) as being obvious over U.S. Patent Application 2004/0175572 A1 to Hintze-Bruning et al., hereafter "Hintze-Bruning" in view of U.S. Patent No. 5,011,881 to Fujii et al., hereafter "Fujii".

Hintze-Bruning generally discloses a multilayer color and/or effect film which comprise at least one color and/or effect layer comprising: (1) at least one component layer (1) comprising at least one color and/or effect pigment (1) in anisotropic

distribution, and (2) at least one component layer (2) comprising the pigment or pigments (1) and/or at least different color and/or pigment (2) in isotropic distribution (p. 2, ¶ 19-21). The film may also have a clearcoat (p. 6, ¶107).

Fujii generally discloses an aqueous thermoplastic coating composition for coating plastics substrates, the composition consisting essentially of (A) an aqueous acrylic resin and (B) a urethane resin emulsion (Abstract). A transparent top-coat composition containing the coating material(s) dissolved or dispersed in an organic solvent can be applied on the coating formed from the aqueous coating composition (col. 7, ll. 28-32).

The PTO concedes that "Hintze-Bruning does not teach the specifically adjusting the temperature of the basecoat film before applying the clearcoat, specific residual volatile contents of the basecoat and clearcoat and specific drying rates, as required by claims 1-8 and 21-24."

The PTO alleges however,

> It would have been obvious to a person ordinarily skilled in the art at the time of the invention to heat the basecoat and clearcoat films to adjust the volatiles content to 3-10% by weight, to employ the average drying rates of 1-40% by weight/minute and to adjust the temperature to 50-35 degrees Celsius, as required by claims 1, 3, 5, 7 and 21-24. One would have been motivated to employ the drying percentages and average drying rates required because Hintze-Bruning and Fujii teach drying of both the basecoat and clearcoat at various temperatures in the same ranges as provided in the applicant's specification.

Applicants greatly appreciate this detailed basis of rejection, but must respectfully disagree for many reasons. First, Hintze-Bruning discloses a drying temperature of 120°C for a second basecoat layer (¶ 139), but is silent on the drying temperatures for the first basecoat layer and the clear coat layer. Therefore Hintze-Bruning does not teach drying both the basecoat and clearcoat at various temperatures in the same ranges as provided in the applicant's specification.

Moreover, to establish a *prima facie* case of obviousness, three basic criteria must be met. First, the prior art reference (or references when combined) must teach or suggest all the claim limitations. Second, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of

ordinary skill in the art, to modify the reference or to combine reference teachings. Finally, there must be a reasonable expectation of success.

The rejection does not meet the first criterion for a *prima facie* case of obviousness, which is that the prior art reference (or references when combined) must teach or suggest all the claim limitations. See, e.g., *CFMT, Inc. v. Yieldup Intern. Corp.*, 349 F.3d 1333, 1342 (Fed. Cir. 2003); *In re Royka*, 490 F.2nd 981, 985 (C.C.P.A. 1974). The cited references do not teach the specific residual volatile contents of the basecoat and clearcoat and the specific drying rates, as required by claims 1-8 and 21-24.

Nor does the rejection meet the second criterion for a *prima facie* case of obviousness. There is no suggestion or motivation to combine the teachings of Hintze-Bruning and Fujii. The mere fact that references can be combined does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Fritch,* 23 U.S.P.Q.2d 1780 (Fed. Cir. 1992).

Hintze-Bruning discloses a multilayer sheet which is cured and wound to form a roll before application to a substrate. The skilled person in the art knows that these multilayer sheets are cut into appropriate sizes, and used as color and/or effect coatings. The finished multilayer sheets are used to coat three-dimensional surfaces by lamination onto metal surfaces, or by injection or compression back-molding onto thermoplastics. In these processes, the solid films are necessarily highly stretched to conform to the surface of the three-dimensional substrate or mold.

Fujii, on the other hand, does not teach multilayer coating films which are cured and subsequently applied to three-dimensional surfaces. In Fujii, the individual paint layers are applied directly onto three-dimensional plastic substrates. Plastic sheets are not the intended plastic substrates. Nowhere in Fujii is there reference to plastic sheets or films as substrates. The intended substrates are disclosed in col. 6, ll. 64-68:

> Examples of especially suitable plastics articles to be coated with the aqueous composition of the invention are the body panels and the components of motor vehicles such as automobiles, busses, trucks, etc.

Applicants respectfully submit that the coating of three-dimensional plastic substrates by directly applying the paint composition in liquid form to the substrate as taught by Fujii is different than applying the paint layers to a plastic sheet, conditioning,

curing, and then applying the cured multilayer sheet to the three-dimensional substrate as taught by Hintze-Bruning. One major difference is the requirement for considerably thicker basecoats and clearcoats for multilayer sheets which Applicants teachk, i.e, (p. 5, ll. 7-13 of the present application):

> Since the known color and/or effect films are highly stretched when used for coating three-dimensional substrates, especially automobile bodies and modules and exterior mounted components on them, it is necessary for their basecoats and clearcoats to be considerably thicker than conventional basecoats and clearcoats, . . .

Appreciating the differences between these two methods of coating a three-dimensional surface, especially the required differences in coating layer thicknesses, the skilled person in the art would not be motivated to apply any of the drying conditions disclosed in Fujii for liquid coatings applied directly to three-dimensional articles to the production of the multilayer sheets of Hintze-Bruning.

Finally, the rejection does not meet the third criterion for a *prima facie* case of obviousness. There is no suggestion in the cited art that the combination of specific residual volatiles contents of the basecoats and clearcoat and the specific drying rates in the claims of the present application would be successful in affording multilayer sheet with the desired properties spelled out by the Applicant.

"The consistent criterion for determination of obviousness is whether the prior art would have suggested to one of ordinary skill in the art that [the proposed modification] should be carried out and would have a reasonable likelihood of success, viewed in the light of the prior art." *In re Dow Chemical Co.,* 837 F.2d 469, 473 (Fed. Cir. 1988). "Both the suggestion and the expectation of success must be founded in the prior art, not in the applicant's disclosure." *Id.*

Several problems have long been associated with the production of multilayer sheets comprising color and/or effect coatings in particular, and these problems are solved by the process of the present application. The problems associated with multilayer sheets arise from the higher coating thicknesses employed (p. 5, ll. 7-21 of the present application):

> Since the known color and/or effect films are highly stretched when used for coating three-dimensional substrates,

> especially automobile bodies and modules and exterior mounted components on them, it is necessary for their basecoats and clearcoats to be considerably thicker than conventional basecoats and clearcoats, . . . However, increasing the dry film thickness leads to a series of problems during the production and application of the known color and/or effect films , and these problems mount up to form a considerable barrier to the production of class A surfaces.

The problems include sinking of the clearcoat into the basecoat, leading to dulling of the clearcoat (p. 6, ll. 22-24); "surface defects on the clearcoat immediately after drying" (p. 7, ll. 22-24); "surface defects during the storage of the sheet, as a result of diffusion, for example leading to waviness in the clearcoat" (p. 7, ll. 26-28); "surface defects during the final curing of the clearcoat film, leading to pops" (p. 8, ll. 1-2); blistering during thermoforming (p. 8, l. 5-6); excessive adhesion to the protective sheet (p. 8, l. 7); and leveling problems occurring when the second basecoat film and clearcoat films are applied (p. 11, l. 28 to p. 12, l. 2).

It is entirely unexpected that the combination of the specific residual volatiles contents of the basecoats and clearcoat and the specific drying rates in the claims of the present application would be successful in affording multilayer sheets having none of the foregoing problems. It is especially unexpected that problems that occur after drying and curing of the multilayer sheets are solved by the specific combinations of residual solvent levels and drying rates, for example surface defects during the storage of the sheet which leads to waviness in the clearcoat, blistering during thermoforming; and excessive adhesion to the protective sheet.

It is respectfully submitted that a *prima facie* case of obviousness over Hintze-Bruning in view of Fujii.has not been made because the case fails on all three of the foregoing criteria.

The Examiner further alleges however,

> Since the drying temperature is one parameter that can be changed for various embodiments of the inventions and directly affect the volatile contents weight percentage and the drying rate, the volatile contents weight percent of the dried film and drying rates are considered to be cause effective variables. It is well settled that the determination of optimum values of cause effective variables such as the volatile contents weight percentage of the

> dried films and drying rates is within the skill of one practicing in the art. *In re Boesch*, 205 USPQ 215 (CCPA 1980)

The PTO's use of the term "cause effective variables" is taken to refer to "result effective variables", the usage found in the cited case law.

Applicants greatly appreciate this detailed basis of rejection, but must respectfully disagree. While the drying temperature may affect variables such as drying rates, and when coupled with a specific period of time, the volatile contents weight percent of the dried film, it has not been heretofore recognized that volatile content weight percent and drying rates are result effective variables that affect the multitude of beneficial film properties obtained with the process of the present application.

Where the prior art has not recognized the "result effective" capability of a particular invention parameter, no expectation would exist that optimizing the parameter would successfully yield the desired improvement. *In re Antonie*, 559 F.2d 618, 195 U.S.P.Q. 6 (C.C.P.A. 1977).

There can be no inference from the disclosure of Fujii for example, that surface defects during the storage of the sheet which lead to waviness in the clearcoat, blistering during thermoforming; and excessive adhesion to the protective sheet depend on volatile content weight percent and drying rates because Fujii does not disclose the multilayer sheets for which these problems are unique. The coatings of Fujii are not applied to thin sheets, they are not stored in rolls, they are not thermoformed, and they are not covered with a protective sheet.

Even though Hintze-Bruning discloses multilayer sheets, there is no disclosure therein of volatile content weight percent and drying rates. There is also no disclosure in Hintze-Bruning of the problems of sinking of the clearcoat into the basecoat, leading to dulling of the clearcoat; surface defects on the clearcoat immediately after drying; surface defects during the storage of the sheet, as a result of diffusion, for example leading to waviness in the clearcoat; surface defects during the final curing of the clearcoat film, leading to pops; blistering during thermoforming; excessive adhesion to the protective sheet; and leveling problems occurring when the second basecoat film and clearcoat films are applied. Applicants respectfully submit that the skilled person in the art would not recognize from the teachings of Hintze-Bruning that volatile content weight

percent and drying rates are result effective variables if neither the variables themselves nor the results dependent on the variables are disclosed therein.

Even if it were evident from the teachings of Hintze-Bruning and Fujii that drying rates and the volatile contents weight percent of the dried film are result effective variables for obtaining multilayer sheets free of surface defects, which is not conceded, the results of optimizing these variables to achieve a multitude of beneficial multilayer sheet properties simultaneously is an unexpected and surprising result.

Although it is well-established that "discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art", *In re Boesch*, 205 U.S.P.Q. 215, 219 (C.C.P.A. 1980), it is equally well-established that a *prima facie* case of obviousness may be rebutted "where the results of optimizing a variable, which was known to be result effective, [are] surprisingly good." *Id.*, citing *In re Antonie*, 195 U.S.P.Q. 6, 8-9 (C.C.P.A. 1977) and cases cited therein.

The process parameter ranges cited in the claims afford multilayer films in which all of the following problems are simultaneously eliminated: sinking of the clearcoat into the basecoat, leading to dulling of the clearcoat (p. 16, ll. 11-14); dulling of the clearcoat arising from surface defects formed on the clearcoat immediately after drying (p. 16, ll. 22-24); waviness in the clearcoat arising from surface defects during the storage (p. 16, ll. 26-27); pops arising from surface defects formed during the final curing of the clearcoat film (p. 17, ll. 1-2); blistering during thermoforming (p. 17, ll. 4-6); excessive adhesion to the protective sheet (p. 17, ll. 6-8); and leveling problems occurring when the second basecoat film and clearcoat films are applied (p. 17, ll. 10-13). Applicants respectfully submit that it is a surprising result that all of these problems were not only minimized, but were completely eliminated by employment of the drying rates and the volatile contents weight percent of the dried film as recited in the claims.

Regarding claims 3, 5, 7, 23, and 24, neither Hintze-Bruning nor Fujii, alone, or in combination, teach or suggest two distinct drying sections for the process for preparing a multilayer film, let alone teach that the number of distinct drying sections is a result effective variable for the desired sheet properties. Again, for a *prima facie* case of obviousness, the prior art reference (or references when combined) teach or suggest all the claim limitations in these claims, *prima facie* case of obviousness has not been made.

The PTO further alleges

> It would have been obvious to a person ordinarily skilled in the art at the time the of the invention to cool the basecoat and clearcoat films to a temperature [of] 50-35 degrees Celsius, as required by claims 1, 4, 6 and 8. One would have been motivated to adjust the basecoat temperature to 35-50 degrees Celsius because Fujii teaches that the basecoat is to be cooled to room temperature, which is understood to be about 30 degrees Celsius. One would have been motivated to adjust the clearcoat temperature after coating to less than 50 degrees Celsius because Fujii teaches letting the coating cool in a chamber at a temperature of -30 degrees Celsius in a preferred example, which is well below the required temperature.

Applicants greatly appreciate this detailed basis of rejection, but must respectfully disagree. First, room temperature is not generally understood to be 30 degrees Celsius. The American Heritage Dictionary of the English Language: Fourth Edition (2000) defines room temperature as an indoor temperature of from 20 to 25°C (68 to 77°F), not 30°C. Even putting aside the dictionary definition, the skilled person in the art would interpret "cooled to room temperature" in the case of Example 4 of Fujii (col. 10, l. 44 to col. 11, l. 9) to mean cooled to the ambient conditions under which the test piece was sprayed, which was 25°C (col. 10, l. 59). Also, the temperature of -30°C cited by the PTO refers to conditioning of the test piece after coating, but prior to conducting low temperature flexibility testing (col. 11, ll. 26-40). This temperature is <u>not</u> the temperature that the coatings were cooled to prior to spray application of subsequent coating layers.

Moreover, as discussed above, the skilled person will appreciate the differences between the coating methods of Hintze-Bruning and Fujii, and would not be motivated to look to the drying conditions disclosed in Fujii for liquid coatings applied directly to three-dimensional articles for guidance on drying conditions for the production of the multilayer sheets of Hintze-Bruning.

Finally, it is a surprising result that individual wet coating layers do not have to be cooled all the way down to room temperature. It is surprising that cooling to a temperature of less than 50°C (claims 1 and 8), or less than 35°C (claim 4 and 6) is sufficient to obtain multilayer sheets with excellent properties.

"Usually, a showing of unexpected results is sufficient to overcome a *prima facie* case of obviousness. See e.g. *In re Albrecht*, 514, F.2d 1289, 1396, 185 USPQ 585, 590 (CCPA 1975)" MPEP 2145.

It is surprising that cooling the wet coating layers to temperatures as high as 35-50°C affords multilayer sheets free of surface defects. The skilled person in the art knows that the higher the temperature of the coating layers, the lower their viscosity, and the more readily they will flow. The skilled person also knows that diffusion is greater at higher temperatures. Thus there is more likely to be "sinking", or diffusion of the clearcoat layer into the basecoat layer of the multilayer sheet at higher temperatures. It is surprising that despite the expected lower viscosity of the wet coating layers and the higher diffusion rates at these higher temperatures, multilayer sheets free of surface defects are still obtained. Therefore it is not obvious that the individual wet coating layers can be cooled to temperatures of 35-50°C and still afford a multilayer sheet free of surface defects.

The PTO concedes, "The continuous clearcoating method is not taught by Hintze-Bruning in view of Fujii, as required by claim 12. Also, curing the multilayer sheets after joining with the substrates by thermal curing, as required by claim 18, is not taught."

The PTO alleges however,

> It would have been obvious to a person ordinarily skilled in the art at the time of the invention to modify the process for producing a multilayer sheet taught by Hintze-Bruning in view of Fujii to include curing the multilayer sheet after joining with a substrate, as required by claim 18. One would have been motivated to make this modification because the transposition of process steps, where the processes are substantially identical or equivalent in terms of function, manner, and result, was held to not patentably distinguish the processes. *Ex parte Rubin*, 128 USPQ 159 (PO BdPatApp 1959).

Applicants greatly appreciate this detailed basis of rejection, but must respectfully disagree. In this case it is surprising that the transposition of process steps as recited in claim 18 still affords multilayer sheets free of surface defects. Claim 18 necessarily requires the multilayer sheet is uncured or partly cured when it is stored prior to joining with the substrate. If the multilayer sheet is not used immediately, "the multilayer sheet

S is wound to form a roll or is cut into smaller sections. The roll can be stored and/or transported until the multilayer sheet is used further" (p. 31, ll. 1-4 of the application as filed).

The application further discloses that surface defects can occur during the storage of the sheet as a result of diffusion between or within the uncured or partly cured coating layers, for example sinking of the clearcoat into the basecoat, leading to dulling of the clearcoat (p. 6, ll. 22-24) and waviness in the clearcoat (p. 7, ll. 26-28). These problems are expected to be worse when the coating is uncured or partly cured. It is surprising the surface defects are eliminated even when the multilayer sheet is uncured or partly uncured. Therefore, it is not obvious that curing of the multilayer sheet after storage and joining with the substrate will still afford multilayer sheets free of surface defects.

The Applicants also appreciate the detailed bases of the rejections of claims 9 and 12, but these rejections are moot because both claims are dependent upon claim 1, which is believed to be patentable for other reasons set forth above.

For all of the above reasons, independent claims 1, 16, and 25, and claims 2-15, and 17-24, and 26, which depend therefrom, are believed to be patentable over Hintze-Bruning in view of Fujii. Reconsideration and removal of the obviousness rejection of these claims is therefore respectfully requested.

CONCLUSION

Applicants respectfully submit that the Application and pending claims are patentable in view of the foregoing remarks. A Notice of Allowance is respectfully requested. As always, the Examiner is encouraged to contact the Undersigned by telephone if direct conversation would be helpful.

Respectfully Submitted,

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